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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/893,976 | 06/29/2001 | Ik Soo kim | 8733.437.00 | 6152 |

30827 7590 04/20/2004

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| EXAMINER | |
|---|---|
| KIELIN, ERIK J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2813 | |

DATE MAILED: 04/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/893,976 | KIM, IK SOO | |
| | Examiner | Art Unit | |
| | Erik Kielin | 2813 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,3-7,9-11 and 13-23* is/are pending in the application.

4a) Of the above claim(s) *21 and 22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-7,9-11 and 13-20, 23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 27 February 2004 has been entered.

### *Claim Status*

2. New claim 23 is submitted. Claims 21 and 22 remain withdrawn from further consideration as being drawn to a non-elected species. Claims 1, 3-7, 9-10, 11-20 and 23 are active.

Moreover it is noted that there is no support for the limitation in claims 21 and 22 that the entire area of the separation gap is formed over the gate electrode. Accordingly, even if these claims were to be considered, they introduce new matter under 35 USC 112(1). The specification does not address this feature, and it could not be considered novel given that this feature in never discussed. It appears that Applicant has merely pulled a feature from the figures; yet the figures clearly show portions of the separation gap not formed over the gate electrode, thereby contradicting the limitation "entirely over." The specification indicates that the object of the invention is to form protrusions of the source/drain electrodes to increase the channel width --not to form the separation gap entirely over the gate electrode.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 3-7, 9, 10, and 11, 13-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification and drawings do not provide support form forming two source electrodes. Nowhere in the specification are the protrusions **38** referred to as separate or two source electrodes. Rather everywhere **38** is indicated to be "a source electrode **38**" or "the source electrode **38**." Additionally, Fig. 6C makes very clear that each protrusion of the source electrode is the still the same single source electrode. Compare the overhead and cross-section views of Fig. 6C for verification. Even though the lower protrusion of the source electrode in the overhead view does not have a separate label of "**38**," the lower protrusion is specifically labeled in the cross-section view as "**38**" thereby indicating the intention that there exists a **single** source electrode with plural protrusion --as particularly verified in the specification, as nowhere in the specification are the protrusions indicated to be plural electrodes. Accordingly this is new matter, unsupported by the original disclosure.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 23 is rejected under 35 U.S.C. 102(b) as being anticipated by Applicant's admitted prior art (**APA**).

**APA** discloses a liquid crystal display device and method of manufacturing the device comprising forming each of the following:

a gate electrode **6** on a substrate **1**;

a gate insulating film **12** on the substrate **1** and over the gate electrode **6**;

a semiconductor layer **14** on the gate insulating film **12** and over the gate electrode **6**;

a source electrode **8** and a drain electrode **10** on the semiconductor layer **14** and adjacent the gate electrode **6**, wherein the source and drain electrodes oppose each other and each includes at least one protrusion that extends toward the opposing electrode (that adjacent edges of the source and drain electrodes are form one protrusion, as shown in Fig. 3C --especially in the cross-section);

a protective layer **18** on the gate insulating film **12** and over the source and drain electrodes **8**, **10**; and

a pixel electrode **22** on the protective layer **18**. (See instant specification, paragraphs [0003]-[0013] and Figs. 1 through 3E.)

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims **1**, 3-7, 9, 10 and **11**, 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (**APA**) in view of JP 2-58030 A (**Taniguchi** et al.).

Regarding claims 1 and 11, **APA** discloses a liquid crystal display device and method of manufacturing the device comprising forming each of the following:

a gate electrode **6** on a substrate **1**;

a gate insulating film **12** on the substrate **1** and over the gate electrode **6**;

a semiconductor layer **14** on the gate insulating film **12** and over the gate electrode **6**;

a "two" source electrodes **8** and a drain electrode **10** on the semiconductor layer **14** and adjacent the gate electrode **6**, wherein the source and drain electrodes oppose each other and each includes at least one protrusion that extends toward the opposing electrode (that adjacent edges of the source and drain electrodes are form one protrusion, as shown in Fig. 3C --especially in the cross-section) and "the source electrodes are protruded from a data line" and an entire area of the channel is formed over the gate electrode;

a protective layer **18** on the gate insulating film **12** and over the source and drain electrodes **8**, **10**;

a pixel electrode **22** on the protective layer **18**; and

wherein the gate electrode **6** underlies a part of the data line **4**, the source electrode **8** and the drain electrode **10** and a part of the drain electrode so that the channel is formed at parts of the source and drain electrodes facing the protrusion (as shown in prior art Fig. 3C cross-section view).

(See instant specification, paragraphs [0003]-[0013] and Figs. 1 through 3E.)

**APA** does not teach that the channel has and "2"-shape.

**Taniguchi** teaches a liquid crystal display and method of manufacturing the display wherein the source electrode **SD2** and the drain electrode **SD1** each include plural protrusions **d1** that extend toward the opposing electrode in order to beneficially increase the channel width of the transistor, thereby creating a "2"-shaped channel having an entire area of the channel formed over the gate electrode. (See Abstract and Figs. 1 and 2.)

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use the source/drain electrodes having plural protrusions and the consequent "2"-shaped channel having an area formed entirely over the gate electrode as the source/drain electrodes of **APA** in order to beneficially increase the channel width of the transistor, which enables reduction of the TFT size and improves the aperture rate, as taught by **Taniguchi** (Abstract.)

Regarding claims 3 and 13, **APA** discloses the active layer **14** on the gate insulating film **12**; and the ohmic contact layer **16** on the active layer **14**.

Regarding claims 4 and 14, **APA** teaches that the ohmic contact layer **16** contains an opening corresponding to the channel **24** (Fig. 3C; paragraph [0009] --especially the last two sentences), but does not teach that the channel is "2"-shaped.

**Taniguchi** shows that the channel is "2"-shaped.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use a "2"-shaped channel as the channel of **APA** to increase the channel width as taught by **Taniguchi**.

Regarding claims 5, 6, 15, and 16, **APA** discloses that the active layer is undoped silicon and the ohmic contact layer is doped silicon (instant specification, p. 4, paragraph [0008]).

Regarding claims 7 and 17, the **APA** discloses that standard channel width is about 25 μm (instant specification, p. 3, paragraph [0005]), but does not teach a channel width of greater than 50 μm.

**Tanaguchi** does not indicate the width of the channel but indicates that the width should be increased. Also the **Tanaguchi** Fig. 1 shows that the channel width is more than doubled by comparing a source/drain electrodes without protrusions to those source/drain electrodes **SD2**, **SD1**, with protrusions **d1** the same manner as presently proposed in the instant invention.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to width the channel width of **APA** to greater than 50 μm by forming the protruding portions of the source/drain electrodes of **Tanaguchi** on those source/drain electrodes of **APA** because **Tanaguchi** teaches that the channel width should be longer than in the absence of such protrusions and shows geometrically that the width of the channel is more than doubled. Moreover, these claims are *prima facie* obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688(Fed. Cir. 1996)(claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from

the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious). In the instant case, the result of forming the protrusions on the source/drain electrodes expectedly increases the channel width as clearly taught by **Tanaguchi**.

Regarding claim 18, **APA** discloses that the channel extends only over the gate electrode **6**.

Regarding claims 9 and 19, **APA** discloses that the pixel electrode **22** contacts the drain electrode **10** through an opening **20** in the protective layer **18** (Fig. 3E).

Regarding claims 10 and 20, **APA** discloses that the data line **4** is in electrical communication with the source electrode **8** (Fig. 3E).

### ***Response to Arguments***

9. Applicant's arguments filed 27 February 2004 have been fully considered but they are not persuasive.

Applicant argues that the applied art does not teach the new features added to the claims. Examiner respectfully disagrees for reasons indicated in the rejection of the claims above which are incorporated herein in their entirety. Applicant's allegation of absence of the new features in the applied art is based upon a selective interpretation of the instant claim features. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 571-272-1693. The examiner can normally be reached on 9:00 - 19:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Erik Kielin
Primary Examiner
16 April 2004